

GOVERNMENT OF INDIA
DEPARTMENT OF EDUCATION, HEALTH & LANDS

Report

of the

Population Data Committee



THE POPULATION DATA COMMITTEE.

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REPORT OF THE POPULATION DATA COMMITTEE.

The Committee was constituted and its terms of reference set forth in Government of India (Department of Education, Health and Lands) letter No. 2249, II(C)/14, dated the 15th May 1944. This letter appears as Appendix I.

2. All but one member of the Committee were busy officers already engaged on whole-time and in some cases more than whole-time work. Even the exception had to assume other duties before the completion of our enquiry. The Mission had no whole-time Secretary or staff of any kind and the absence of this provision has been a considerable handicap. It is precisely a Committee composed of already busy officers who need most to be freed from administrative details.

3. The two earlier reports we have put in have shown the difficulties we encountered. We have no intention of going over that ground again but a summary can be given in order to make this report complete. Briefly, the main point of the Committee's concern was the 1/50 sample drawn by the Census Commissioner for India from the record slips of the 1941 enumeration by marking every 50th slip. This, now known as the Y-sample, was the key to our operations and any prospect of useful suggestions for action. That sample had lain for 3 years all over the country, in parts subject to removal and even loss as a result of the effects of war; thus in some districts of Bengal the slips had been physically destroyed; and transport, accommodation and handling represented a series of frequently acute problems. Accommodation, for example, had to be in the already crowded Statistical Institute, transport had to be against the acute difficulties which characterised the year 1944 on Indian Railways and so on.

4. Our Committee was charged with exploration rather than execution but nevertheless had to cover, as this report and its appendices show, a considerable amount of detailed and complicated statistical performance. All of this meant considerable demands for time and supervision which it was only possible to meet by members of the Committee themselves taking part at considerable pressure in work which should appropriately have been in the hands of a staff recruited for it. We feel therefore that the staff and general provision for the Committee were on too narrow lines and suggest this as a point to be borne in mind when Committees are being formed. The best results from active minds operating on a scientific theme are generally achieved when they are freed from routine and are given appropriate provision.

5. The simplicity and the generality of the terms of reference reflect the Committee's origin. Briefly India was at a period of marked population change. It was also on the threshold of great developments in industry and other fields. To plan for these developments required a knowledge of the grouping of the population and if possible a forecast of how that grouping and the numbers in each group could be expected to change.

This in a way is elementary. Administration is of people. It is human beings who live in the countries, do the work, pay taxes, have the children and in due course die. The abstract noun is perhaps the chief enemy of accurate thought, apart from the realms of philosophy, and certainly we have the impression that this basic fact has been apt to be obscured in the general talk in terms of "population" "development" and so on as though population meant anything but human beings, or development was anything but "for" human beings. There is grave danger in the too ready use of general terms for what are in origin particular phenomena. We cannot solve the so-called "population problem" except at second-hand through the individual volitions of human beings. The laboratory is necessary and as in every field the intelligence; but in this particular field they only go part of the way and th

results we study and seek to interpret follow from the obscure reactions of individual men and women. These reactions may and often will be to causes unknown to us but we can be certain that there enter many other elements of motive than considerations of national population. In fact these last considerations are the least present of all, and apart from artificial and brigaded economies one might say that the prime aspect of any so-called population problem is this elementary but elemental one that "population" is just another way of saying people. Consequently while we again stress the importance of methods in recording population events we stress equally the importance of evolving methods in harmony with the life of the people whose births and deaths we seek to record.

6. However the position was that by 1944 a variety of problems had impressed on the Government of India the need for basic information about the numbers of people in the country now and who might be expected to be in it later on. Food administration in 1943 and cloth administration in 1944-45 afford striking examples of the difficulties caused by the absence of this basic information. Faced with the absence of any age table from the 1941 census they took the correct decision to examine first the state of their knowledge and our terms of reference express this sound scientific approach.

It is significant that in the U.K. itself, even though it is equipped with much fuller statistics than we have in India, the Royal Commission on population has as its first act appointed three committees of which the first in urgency and importance is that on statistics; and one function entrusted to that Committee is precisely that which our Committee has set before itself, namely to examine and present the state of the available material.

The U.K. statistics Committee has also the duty of processing the material to extract from it for the guidance of the Royal Commission and H. M. Government every fact or conclusion of value. Our committee has a more limited scope and the absence of any whole-time staff would in itself rule out any question of elaborate process. We have however in one essential field carried out operations of considerable complexity and based on these have put before Government a definite programme for work to express our conclusions in terms of (a) age tables, (b) life tables and (c) population forecasts.

7. While it is our intention to make our report as short as possible we feel it necessary to make preliminary reference to certain general points of principal. This feeling of necessity springs from our impression that one of the most serious defects in the Governmental and indeed general attitude towards statistics and information generally is the absence of a true appreciation of range and values. Unless this defect in approach is remedied the correct attitude towards the collection, treatment and use of statistics in the country will not be achieved. And yet, unless such an attitude is reached there will be no serious foundation of solid information for the hopes and schemes for the future of this great country.

We would sum up these general considerations as follows :—

(i) There is a difference between general knowledge and precise knowledge.

(ii) The extraction of data should always be by methods which are in harmony with the phenomena to which they relate.

(iii) The meter reading is the ideal statistic.

(iv) But even a meter reading depends on an accurate meter tuned directly into the phenomena to be registered.

8. The first of these points may sound obscure but is not really so.

This difference is very important. It ought to be the function of statisticians to provide only the latter. "Precise" here does not necessarily mean that the statement made is one of absolute finality; but rather that the form given to the statement reproduces exactly the scope of the knowledge existing on the point in question. After all it is a commonplace of science that absolute determination of both velocity and location is impossible; it is also a commonplace of science to state results as subject to such and such a margin of error or variation. The essence is that the statement should convey a just picture of the degree of the knowledge.

This consideration affects the whole matter of vital statistics in India. There is knowledge about them. It is well known that the birth rates and death rates run much higher than in countries of the West. And that infantile and maternal mortality rates are very much higher. But there is a great difference between declaring that piece of undoubted knowledge and stating the actual rates themselves. There is thus no real contradiction between the fact that the birth and death rates in India run consistently higher and the inability to say with confidence that they are precisely this and not that particular figure. Policies and departures in policy should however be anchored always to accurately recorded facts and now that population questions in India are receiving so much attention the time has come (is in fact long overdue) for the actual organisation of the information itself to receive attention.

We do not deny the value of what we have called "general" as opposed to "precise" knowledge; far from it. There is a field for both. What we emphasise is that published statistics should seek and observe the precise form and the object in every country should be to translate as much as possible of the general knowledge into this precise form.

9. (ii) At any time in any country there is always far more knowledge in existence than is presented to the student or administrator. Blue books do not hold all that there is to be known about a country although some people appear to think they do. One might in fact judge the quality of a country's published statistics by the degree to which they enable the intelligent stranger to form a reasonable picture of its life. This is a high standard but it is the standard which in modern times every Government should set before itself. It represents something much more difficult than say customs figures and calls for understanding as well as arithmetic. We have used the term "translation" because to present certain types of social knowledge in the rigid form of figures calls for what is in effect translation. The translator anywhere must, if his version is to carry credit and acceptance, be intimately acquainted with the original language and subject matter. The same applies here. A real understanding of the original data is fundamental to the production of statistics that have life. Hence the importance of the point we have urged elsewhere namely that the object of every recording system should be to get as close as possible to the original occurrences by accurate automatic detached observation. To adopt a phrase used by our chairman, the perfect statistic is a by-product, the automatic record of a reaction to some other phenomenon.

10. (iii) The point on this is that the response is automatic and that no preconceptions enter either in the response or in the recording of it. There may of course be conscious villainy as when some one sets a taxi meter wrong or deliberately misreads the legend, but that may happen in any field and is not the issue here. What we have in mind is automatic response and recording and the nearer administrative recording gets to this the better its ground information will be.

11. (iv) From this the next consideration follows naturally ; the administration system by which the Government's information is secured must itself be devised towards achieving the perfect record.

Methods are of the utmost importance and in many scientific fields an improvement in methods has enabled discoveries of great moment to be made which had remained unknown because unperceived by the instruments and methods of earlier times.

Methods change and develop and are superseded just like the other efforts of man but, no more than in other fields of man's knowledge, do such changes or improvements fall from Heaven ; they come rather as a result of conscious effort. In other words, improvements in methods follow most often definite research and experiment directed towards the method itself. The administrative field is no exception. It should rather be a notable illustration. It can hardly be said that this applies in India when the vital statistics are still collected in many cases at second or even third hand and may have no stronger basis than the recollections of an illiterate chowkidar. We offer no disrespect to the Chowkidar, who with his fellow village officers is in many ways the basis of the whole Indian governmental scene ; within his limits like his fellows he performs admirably his role. But the role itself is wrong. If we apply the metaphor of the meter reading there is no automatic contact between the phenomenon and the record of it, and individual sources of error and delay are introduced in a pronounced form.

We deal in more detail below with the specific matter of vital statistics and confine our present reference to emphasising again that methods should be designed deliberately, after experimentation if necessary, to produce a record as close as possible to the phenomena and as free as possible from intervening human agencies.

12. The data bearing on population growth are, like everything else in India, highly individual both in their extent and variations and deficiencies. They are by no means so limited in value, for example even the vital statistics, as some pessimists regularly urge. Part of the difficulty springs from the wide variations in standard and from the fact that from the population point of view India is a continent rather than a country. If one takes Europe without Russia, almost equivalent in size and comparable in population, one realises that the difference in standards between the UK at one end and Bulgaria and Rumania at the other may be as great as that between Bombay and Baroda and some small State in Central India, or for that matter between provinces in the South and those in the East of the country. And, as we have pointed out in the discussion on vital statistics, there is a good deal to be said on scientific as well as on administrative grounds for not regarding the all-India population rates as the most useful in discussions or forecasts. At the base of every scientific enquiry there is this question of scale and range. Too wide a range may defeat penetration and indeed range and penetration go rarely together. In this field of population data however, so long as it is a definite matter of research into Indian problems and not merely a figure for the League of Nations' yearbook, there is scope for the serious study of the appropriate unit. This is not necessarily, or indeed at all, the existing provinces and we cannot offer here any declaration on what it should be. What we can say is that this question of the proper unit for population measurement and forecast is one requiring specific study by competent enquirers.

13. We have discussed separately the value of the vital statistics for our present purpose and can sum up that discussion by the conclusion that while there is general knowledge there is no precise knowledge. Here there exist in notable degree the variations in standards we have referred to. But this is not only regional but obtains even within the individual region itself.

14. Apart from the vital statistics and the census record we have examined the whole field of possible information bearing on our terms of reference, i.e., data bearing on population growth. That field is bare. The statistics of life insurance companies cover as yet much too limited a part of the field. Apart from the actual limitations in the sense of the proportion of the people who are covered, there is a most pronounced selection which we are satisfied on studying available records removes this particular group of data from any usefulness for our purpose, whatever value they may have for any more limited objects.

Individual studies, or enquiries unless they had a significance beyond their locality and were of standards justifying projection or deduction from them, could not be expected to throw much light on our problem. That impression was justified by our enquiries. We have not thought it worth while to give the details of these studies. Many have no sample value at all and indeed the number possessing this value is very small even as samples of a limited value. We noticed with interest the influence of the Census Commissioner for India in this as in other fields and associated with the 1941 census were one or two enquiries based on sound methods which should be of considerable value for the provinces or States to which they relate. But their projection value beyond their local area is a matter that would require far more elaborate test than we could have been able to give and in any case the range covered is inadequate.

We may refer here to one or two of these investigations. On page 29 of the Census Report, 1941, of Travancore, tables are given showing the percentage distribution of households with stated numbers of rooms in respect of the entire number of houses enumerated in the State, and also in respect of a sample of the size in 20 selected therefrom. The statistical constants of the distributions in the complete enumeration and the sample are fundamentally identical.

A survey of rural areas (about 2 per cent. of the villages) in Ajmer-Merwara was undertaken at the Census of 1941. A Report of this is available in typescript. The fertility statistics obtained there were used as the basis of calculations in the note on additions to Population till 1970 appearing in the All-India Census Report (page 41).

15. While on this topic we should like to comment on the extreme desirability of a strict use of terms, in particular the importance of distinguishing between a genuine random sample and what may be called a type study. The first may have a projection value, subject to the quality of the actual sample itself as displayed under severe test. Too frequently, however, the word 'sample' is used loosely to cover what is merely a selective and unrepresentative study; in fact we have seen the word used in connection with enquiries so highly selective as to be purely personal in their approach. We do not deny the indicative value of any well conducted survey; the danger is of making from these surveys deductions which they could not and were not meant to carry. Hard things have been said about the pedant and with reasons; but insofar as the pedant insists on strict use of words he has the support of the scientist, and in statistical fields particularly where one in effect is operating in probabilities, it is of the first importance to have neither illusions nor confusions.

16. The vital statistics in any country ought to be the main platform for population discussions, certainly where the growth of population as distinct from the quantum at one time is in question. In India unfortunately although these statistics are discussed annually in Government reports, and mortality and other rates erected, the limitations and variations in their collection and standards make them an inadequate guide towards projections into the future. One could say that their value is only dimensional and even

the stating of this dimension for the all-India field is not easy. Variations in standards are among the most awkward of statistical difficulties. If the standard is known and is common over the whole field of enquiry, it is often possible, if the mass of observations is considerable, to derive information of surprising value by the application of statistical methods. When standards vary, however, the field may have to be broken up and the variation may be such as to inhibit its reconstitution in the form of an all-in figure. We have such a position in India where vital statistics are concerned; they can offer no all-India projection basis. Nor unfortunately does any single unit of the country throw up vital statistics of sufficient quality to provide such a base even for the Province or State. Here and there isolated localities have statistics of high quality but the limited range removes serious projection value; one cannot calculate a Province's population from the statistics of a town or even a tehsil.

We can only regard it as a grave defect that India should have been left so long without a satisfactory system. It is true that federations are apt to be bad in this field and that the USA for example did not pull its recording system together till the early years of the last decade. That merely indicates the importance for India of the action which both the USA and Canada had to take; namely the Central Government had to enter the vital statistics field by specific direction, assistance in funds and general co-ordination, development and prescription of standards.

17. To be absolutely satisfactory, vital statistics should be (a) 100 per cent. complete and (b) 100 per cent. accurate. This being a world of imperfection neither of these will in practice be achieved but it is definitely within the power of any Government to establish 98 or 99 per cent. completeness and, although not so easily, a substantial uniformity and elevation of standards which will enable the information to be used with confidence in projection.

We do not say that such standards can be reached in India without a very considerable strengthening of the whole organisation of Government in this field and a great development in popular attitudes towards vital statistics, but the standard is there and should be kept always in view.

India has a considerable leeway to make up in both fields but these two are not independent. And of the two the first is the more important, as well as the more immediately intelligible and achievable. Thus we would suggest that the first object should be complete cover by which we mean that in every inhabited area all incidents of birth or death are reported through an established channel as they occur.

18. We have studied the Indian position on both heads and on both that position is deplorable. Thus a close study of one of the better areas of registration shows that the lowest figure of under estimation of birth is 40 per cent. and that a more likely one is over 50 per cent. For under estimation of deaths the range is even greater, from 35 to 55, with probabilities again nearer fifty, nearer the top than the bottom. If the ages are taken into question the under-enumeration of deaths covers a span of 25 to 65 per cent.

This we repeat reflects conditions in one of the better areas, where attention has been paid to vital statistics and a real attempt made to improve and to use them. The adjoining province of Madras which has done more work than any other has much the same tale of under-registration.

We invite attention to Appendix III prepared from the records with the Public Health Commissioner which shows the wide range of birth rates for the various provinces for rural and urban areas respectively. This illustrates admirably the point made above.

19. Examined in this light one can only put aside as worthless from any mathematical point of view the statistics of other areas. Even in these areas so-called birth "rates" and death "rates" are often being solemnly calculated per thousand. Worse still, they are in many cases not only calculated per thousand but are taken to one or even two places of decimals. In our view there is no birth or death rate in India which will stand a figure after the decimal point at all. We doubt whether even the best can stand the units digit. And for a large part of India the system and the figures collected are such that no significant rate at all can be derived.

So far as the All-India "rate" is concerned it suffers from the dangerous statistical defect of being a mingling of information of widely differing values. The defects that spring from this are not usually adequately or indeed at all realised. It is far better to have separate lines of statement, each set out in accord with the data, than to pool together a mass of information of widely differing standards and quality. To apply purely arithmetical methods to such conglomerations is unsound.

20. It follows from this that in our view the so-called birth and death "rates" for British India or All-India which from time to time are published represent unsound methods and as statements have no serious value. We felt that it would be sounder and more salutary to speak of All-India birth and death "rates" as being "of the order of". The advantage of this location is that anyone reading it seizes automatically the uncertainty zone and will not be led unconsciously into efforts of deduction or calculation. We recommend that in all published tables a column be added headed "Probable Rate" and that in this be shown the crude calculated rate adjusted on the principles above, bearing in mind that the main fault of vital statistics in India is omission.

It was the Census Commissioner's intention, had the 1941 census tabulation been pursued to have investigated age distribution and mortality on a regional basis. Thus the way of life of Kerala or south-west India differs markedly from that on the other side of the Western Ghats and there are other, although not so pronounced difference between, say, the life of Gujerat and Maharastra. At any rate, the enquiry would have given guidance on whether in fact there were likely to be any significant differences, and in a country of the size and variety of India, the validity of any "All-India" rate should be carefully scrutinised to ensure that significant differences are not being obscured.

21. There may appear a certain contradiction between the frequently repeated statements—as in this report—that Indian vital statistics are unreliable and the equally frequent appearance of such statistics in published volumes of the Government of India and Provincial and State Governments. All these volumes contain so-called "rates" and frequently what we regard as quite unjustifiable figures after the decimal point. One can readily understand a certain bewilderment on the part of the citizen who may well say that if they are unreliable, why does the Government give them.

Provided a figure is stated in appropriate dimensions or is accompanied by a definite indication of the zone of error which attends it, there is no objection to its appearance in a published volume. To state them without any such indications of validity is unjustifiable and administratively unwise. We have shown that in areas of relatively higher standard the published "rates" may represent 40 or 50 per cent. understatement. Now 40 per cent. of 30 is 12 and $30 + 12$ equals 42. Thus, for example, a certain so-called rate of 30 per thousand which came to our notice was not only inaccurate to places of decimals or the units digit, it was not even significant to the tens.

22. The reason we emphasise all this is that we feel that governments and peoples in India have been living in a statistical vacuum without knowing it and that they will never know it and thus be led to improve things until they know how worthless their published figures are.

In our view the Public Health Commission and the public health departments or whoever puts out these "rates" should from now on couch their references in language justified by the data. This we feel would have a salutary influence not only on public opinion but on governments themselves.

23. Another point that impressed itself upon us is the prevalence of extracting birth and death rates for small towns under 5,000, 5,000 to 10,000 etc. A "rate" per thousand on a population of 5,000 means at once under present or immediately foreseeable conditions that the units digit could have no significance. But we feel that the small town offers no serious base for the calculation of regular birth and death rates. Cities and substantial towns are different but one has to be on guard against figures for figures' sake.

24. One must also be on guard against the very common inability to perceive the difference between the fact of a birth or a death happening and the consequences that follow. The first is a straightforward demographic incident with which the whole Government is concerned ; the latter are public health matters primarily. For instance the public health authorities should know the causes of death operating in every small town ; but it does not follow that so-called "rates" should be extracted per thousand for every small town.

25. A system of vital statistics providing a complete and accurate record, day by day, month by month, year by year, is the natural basis and one that every country with any pretensions to advancement should provide. It has begun to dawn upon the Governments and peoples in India that there is something incongruous in planning elaborates schemes against a statistical background so defective on the basic question for any country or any plans, namely the number of people to be provided or planned for. It is not possible to set up in a month or even a year, a vital statistics organisation which will satisfy the criteria mentioned above. The flow of information has to be organised just as carefully as any single element of construction. This Committee's concern is with the present issues ; we shall concentrate therefore on presenting the essentials which must be provided if India ever is to develop a flow of information on this fundamental matter.

26. Vital statistics in India have come more or less into the position of not being the definite responsibility of any single authority. This is the not unnatural consequence of the complete incuria in their regard which has characterised the governments of this country. The interest of public health and the medical side generally in vital statistics is evident enough, particularly in causes of death, but in our view all fundamental statistics should be brought into the main current of administrative direction. Vital statistics are not a kind of administrative orphan ; they are the fundamentals of any intelligent administration and a scientific approach and control should characterise them throughout. We cannot overemphasise the importance of this scientific approach. We do not go further into the question of how they should be developed in future as we understand that this topic will be discussed exhaustively by the Health Survey and Development Committee under the chairmanship of Sir Joseph Bhore. We would only emphasise the importance of distinguishing between the so-called social occurrence i.e., the happening of a birth or a death and any public health matter. The first is fundamental to the whole administration ; the second is a quite different, much more limited and specialised aspect. We make this point in order to

emphasise how essential it is in our view that the full, accurate and regular recording of these social occurrences should be linked with the main executive authority of the Government and not be regarded as something purely departmental. The Collector of a district should be made aware that the quality of the vital statistics of that district is his concern just as much as law and order or the land revenue. Provided this is established, the main point is secured ; until it is established the tendency will persist for vital statistics to be regarded as a sideline.

27. The main and indeed the only field offering any possibilities of immediate practical effort was the census. The All-India series goes back to 1872 although the whole country was not in fact covered in that year. Indian Census history, like its history in other fields is highly characteristic inasmuch as an apparent void becomes on closer examination not so empty after all and there is probably considerable scope for study of previous efforts in enumeration which characterised for example the Madras Presidency in the middle years of last century. Indeed it appears that the existence of systematic although not probably complete enumeration in that Province prompted the All-India departure in 1872. This would need of course very close study and much more time than this Committee could afford but we suggest it as a useful piece of research. As we remarked earlier there is often much more information available than is realised and, especially in India, we must be ready to dig for it and not wait for it to be handed over ready-made.

The most important of any Census series for such a purpose as ours, is of course the latest, but for us unfortunately the latest is also the least, since the Government of India's decision in 1941 to limit tabulation did not spare even the age table.

28. The Census Commissioner's intention, had he been allowed to proceed to full tabulation was not only to extract the usual tables, among which would have been the age table, but also to make a search analysis of all age records in order to prepare a population prognosis for the Government of India as one of the essential points of statistical provision. It was also his intention to examine questions of age distribution and reproduction and in fact the social field generally on a regional as well as on the standard Provincial|State|All-India lines. Even if such an enquiry exposed no significant differences that in itself would have been a point of great value ; it is knowledge we lack and to the scientist the disproof of an idea is as valuable as its proof, for in both, we replace a concept by a fact.

29. It is convenient to sum up here the precise position reached in 1941.

(i) The material extracted for All-India was distribution by sex and community. This was published on a district and city basis.

(ii) For the following areas however representing populations of roundly 1-1/2 and 60 millions respectively full or approximately full tabulation was carried out :—

British India.		Indian States.	
Delhi	..	..	Kashmir & Jammu.
			Certain Punjab States (Kannuthala)
			Nabha, Malerkotla & Patiala).
Ajmer-Marwara	..	..	Rajputana,
			Gwalior.
Panth Piploda	..	..	Central India (except Makrai).
			Rampur.
			Benares.
			Mayurbhanj.
			Patna.
			Idar.
			Jamkhand
			Bhavnagar.
			Hyderabad.
			Mysore.
			Cochin.
			Travancore.

The existence of these areas of full tabulation has been vital to the success of our main studies. The great bulk of this field comes from the Indian States and the thanks of the whole country are due to them for having followed the Census Commissioner's advice to proceed to full tabulation notwithstanding the part efforts adopted for British India.

(iii) The extraction of a sample of 1/50 over the entire field. The existence of this sample, taken on the initiative of the Census Commissioner for India, has been the saving of the whole position.

(iv) Among the changes of method introduced in 1941 by the Census Commissioner was one which brought the original data on to the slip which was actually sorted. The existence of this innovation was also fundamental to the success of our investigations ; unless it has been done the sample could not have been extracted. Nor for that matter could the minimum tabulation have been done within the time and funds allowed.

(v) Varying degrees of tabulation of the 1/50 sample carried out in British India and elsewhere, dependent on the time and labour available. Thus Sind and Bengal were able to cover an appreciable field whereas Madras and the U.P. could do none at all.

(vi) The intention was that the slips should be kept against possible future sorting later on and that the sample should in any case be kept as a separate unit in the main Government records.

30. Evidently the first concern of our Committee was an age table for 1941. Unless this was secured there was no means of forming a prognosis at any rate expressible in projection figures, of future population trends. The first question therefore, we put ourselves was " can we now sort out this age table for 1941 " ? The answer was clearly no. The full body of slips is not available. We have already referred to the actual destruction in some areas of Bengal but this was not the only region in which the census records are no longer complete. Apart from this there were extreme administrative difficulties which, so that the Government will be aware of the kind of problems a census tabulation throws up, we have summarised below. But the prime point was that for a complete sorting a complete record is necessary and a complete record is no longer there.

The conduct of an Indian census is inseparable from a full use of local knowledge. Census slips are written in at least fifteen languages and in various dialects as well, in the scripts associated with these languages, not to mention local peculiarities in writing and terminology. Even though the question of age is answered in figures, several types of figures are used. Hence any sorting of the whole range for the age table posed the alternatives :—

(a) Concentration of all slips in one place.

This was impossible both from the aspect of physical accommodation and that of recruiting persons competent to handle the slips. Even omitting the areas of full tabulation 350 million slips would occupy about 20 thousand cu. ft. even if tightly packed in pads ; since they were loose, the space required for mere storage would be much greater probably 60,000. The floor space for handling would have run into the biggest Clive Street Office building.

(b) Distributing the work over the various language areas. This would have meant local office provision training, etc. on a substantial scale ; in fact recreating at haste the trained, organisation disbanded in 1941. This was impossible. The men were simply not to be had and the training and organisation required went far beyond what a Committee like ours could do.

31. The outcome was to rule out therefore any possibility of the whole body of slips being examined. Nor do we believe that this would ever have been possible unless the Government were prepared to reconstitute the Census Agency as it existed in 1941.

32. This left as the only hope for present effort—the Census Commissioner's 1/50 sample or, as it is now known in statistical circles, the Y-sample.

Here prospects were promising. The Census Commissioner's instructions were such as to give a good prospect of genuine randomness provided they had been fully carried out in the difficult conditions of 1941. Its dimensions made handling practicable, although even so a body of nearly 8 million slips occupies at one time several hundred cubic feet in the tightest possible packing, while its handling requires a considerable extent of floor space. In 1941 the Census Commissioner had asked all provincial and State superintendents to do what sample sorting was possible and certain sample tests carried out by some officers in pursuance of this instruction had shown a promising closeness of prediction. Thus, for example, the proportion of the main communities in Punjab to the total population revealed by the sample differed by only a small fraction of 1 per cent. from that revealed by sorting of the entire 28 millions. Similar closeness was observed elsewhere and although the limitations of these pointers are evident enough, the promise on the other hand was equally manifest.

33. It has been our object to keep the main text of this report free from technicalities in order that our conclusions can pass at once into the understanding of the non-technical reader and indeed of every citizen. The specific tests applied to the sample with the outcome of each are set out at length in paragraph 18 of Appendix XI and paragraph 3 of Appendix XII. Here we propose to say only that our guiding principle throughout has been the golden rule of our Chairman, the would-be sampler must be his own first, last and worst critic.

Appendix II sums up the position regarding slips which reached us. The column headed "not obtainable" means in fact slips known to have been destroyed.

The complete and sample tabulations referred to already left us with age tabulations both on the complete field and on the Y-sample for 60.3 millions; and on the Y-sample only for 100.4 million. In all, therefore, age tables in the standard form (Imperial table VII) are available for 160.7 million out of 389.

Other age tabulation on the sample exists for about 29.6 millions but not on the standard grouping. This tabulation must therefore, be put into the standard age form if it is to be used for projection. For regions covering 47 million people in British India defects in applying the sample make the tabulations more or less useless. A selective approach and projection value do not go together. Finally for about 151.7 millions no age tables of any kind are available and for 228 millions any action must repose on 4-1/2 million Y-slips out of which we have yet to receive about .09 million and we know .07 million have been destroyed.

34. The Government of India in the Home Department have separately under consideration a proposal to transfer the Y-sample into Hollerith cards. This has an evident bearing on our report, and our Chairman and the members working at the Institute in Calcutta have been kept in touch with this project. The preparation of age and life tables we elsewhere recommend requires for certain areas in which no previous usable sorting exists, the physical sorting now for slips representing 228 million people. The slips are by now 4½ years old and are showing signs of wear. We do not regard it as possible that accom-

modation or staff difficulties will permit the entire body of slips ever to be handled again and therefore the Y-sample must be regarded as the one link with the 1941 census. Since it is evident that there will be many demands on it for purposes other than those concerned with our report and the enquiries and calculations flowing from it, we feel that the Y-Sample should be put into reasonably permanent form at the earliest possible moment. When this is done, the age sorting necessary for the areas we have referred to can be done readily and conveniently from the cards.

We, therefore, recommend the early adoption of this proposal.

35. On the main issue, the validity of the Y-sample for the purpose of preparing age tables as it were in retrospect for 1941 and thence life tables and population projections, the outcome of our experiments is that the sample is valid. We reached this conclusion independently as a result of the exhaustive tests referred to, but we took advantage of the presence in India of that distinguished statistician Prof. R. A. Fisher, F.R.S., to set the problem and our work on it before him. We give his report in full as Appendix IV, but add an extract below :

" My opinion is that the agreement between estimates based on the Y-sample and the complete count is in many cases quite satisfactory showing that in these cases the Y-sample has behaved like a true random sample.

It should be possible therefore, to obtain satisfactory age and life tables and population projections on the basis of the Y-samples."

It is not everyone who is given the chance to make-up for missed opportunity but the Government of India is in this fortunate position, thanks to the initiative of the Census Commissioner. As we remarked earlier, the existence of this Y-sample has saved the whole position and we are profoundly impressed by the vital importance which may attach later on to the actions of a single man in the past. We emphasise this because of the vital importance of avoiding in future shortview decisions on fundamental issues. This emphasises as it were a negative aspect. From the positive aspect the fact that this Y-sample was taken and has been available for test and study has made an invaluable contribution to statistical methods in India which may lead to a revolution in administrative practice.

Enquiries can be conducted with a greater degree of reliability, and in any event there is the possibility of making an exact statement of the risk of error that may be present. The utilisation of this method at future censuses has been canvassed in Section A-II at page 11 of the All-India Census Report 1941.

36. Subsequent paragraphs and a concluding summary will set out the specific proposals for action. At this point we make the general recommendation that the Central Government should play from now on a clear and positive part in the whole matter of population statistics. There is however immediate technical work on hand—compilation of age tables, life tables, population projections and investigation of the sampling method in population statistics in general among them—which cannot wait till a permanent government establishment is set up. Considerable work on these topics has been initiated by the two Calcutta members of our Committee. The specific background so gained and the general fund of experience available there make it necessary that further work in these directions should be located at the Indian Statistical Institute in Calcutta.

37. The all-India census has regularly based itself on a house list, realizing thus that if the prime purpose is to lay hold of every human being the first step must be to locate and mark every place where a human being may be found and to ensure that some one visits it. The Census Commissioner in

his report presses strongly for the house list to be made permanent. We entirely agree. There is evident waste of effort in the erection of such a list every 10 years and the numbering of every house, to be followed at once by a relapse into neglect. We recommend therefore that a house list be prepared for the whole of India and maintained. Preparation and maintenance should be carried out by the appropriate local staffs.

Thanks to the census practice, there is ample local knowledge on the preparation of a house list throughout India. The unit is the family dwelling, not the building. The lists should be grouped by the municipal board or rural village, etc., to enable immediate linkup with the main units of administration.

The details recorded should be—

- (i) A serial number.
- (ii) The house identification detail.
- (iii) The name of the head of the household.
- (iv) His means of livelihood.

The house list as applied in the census of 1941 contained a heading for the number of adults and children in it. This entry was found to be of considerable value. We have omitted it, however, in our proposals for considerations of convenience and simplicity and also to avoid any possible confusion with Census operations and the misunderstandings which may flow from such confusion. Once the main form of the house list is established, it would be easy to add other items gradually as desired.

Our proposals are, in effect, for an all-India house list and, therefore, it follows that the form of this list should be standardised. It will be a permanent record and the most convenient method of arranging this and providing, e.g., for future entries will require a good deal of thought and experimentation. Once introduced, the form will for obvious reasons, not be easy to change and prior thought and experiment are all the more important. The Indian Statistical Institute is already giving attention to this, and we suggest that it be directed to continue its study and produce definite proposals for Government's adoption.

As time goes on, it may be desirable and possible to add to the information recorded and gradually to build up the house list into a compendium of essential information. This, however, is not in any way essential to our main point which is the production of a basic record of regular units of habitation and the numbers in them.

On such a house list studies of all kinds can be based ; for its existence will enable random methods to be applied with confidence. We have already emphasised the importance of achieving this. In fact the house list will provide the essential statistical basis for enquiries of any kind concerned with the people of this country. Hitherto information in India has been too often collected by getting someone to report. With a house list in existence India will be able to obtain it by a rational, controlled and direct enquiry.

For example, a serious attack could be made on the vital statistics question through a sample enquiry based on a complete and accurate house list. This house list would give the universe from which we could draw a true sample. Once we had a true sample we could have the vital statistics actually determined and from them by appropriate methods arrive at a determination of the probable mortality rates for appropriate regions.

Apart from vital statistics and connected matters, the house list may find an invaluable function in relation to housing itself. If anything like the anticipated increase takes place, in urban populations especially, great problems of housing confront the country for which the existence of better basic data will be essential.

38. This question of house list erection, mortality rates and in general the whole aspect of population knowledge has particular relevance to Bengal. The recent history of this province has been unfortunate and it is not necessary for us to enlarge this by reference. The reports and other documents presenting aspects of the province's life and administration are well-known and we have no intention of dwelling on them or even referring to them. Our object is to bring out that basic data affecting population have suffered from the administrative defects and difficulties which unfortunately have characterised the province. The 1941 census enumeration was carried out under conditions of great difficulty and contention but quite apart from the events of that year the basic elements have never been as satisfactorily presented for this province as for other parts of India. Since 1941 there have been many disturbing elements and the whole course of the war had a greater population impact on Bengal than on any other part of the country.

One of the first fields for the house list therefore should be Bengal and we make this a particular recommendation. Every statistical record is governed and limited by the original source of its data and physical and other conditions of this delta province are such as to make house list determination less straightforward than in other areas. Since however completeness and accuracy are cardinal to the whole conception it is essential that special provision be made to overcome the peculiar local difficulties of Bengal in producing a complete house list.

Subject to the erection of such a list and its rigorous check, and assuming its completeness to have been established, we recommend also that in the first three months of 1946 a census be taken on a sample basis, the sample being struck from this house list. This will not only contribute fresh information to the basic data of the Bengal situation and a starting point for fresh determinations of the population and mortality details but will be an invaluable test of a method which may very well be applicable later on and regularly as a standard means of recording India's population.

39. As one aspect of the always difficult Bengal situation we have the apparent indications of a fall in the birthrate in that province. For reasons that will be amply evident from the rest of this report we can base no conclusion on the information before us; but we feel it important to follow up a topic of undoubted importance. The phenomenon may be the result of war-time separations or may have a relation to other conditions in the province but at any rate we should try to establish the facts. Any influence of war-time separations indicates that the enquiry should be made at once. The house list we have proposed would form an admirable base for the enquiry but even without this enquiry could be conducted on a two stage plan, i.e., first a selection of villages at random and then within each village a random selection of families. The Statistical Institute has certain experience of this kind of enquiry and for reasons springing from the internal conditions of Bengal the compilation of a house list to the standards we have indicated may take considerable time; therefore we recommend that if indications are that completion of a house list satisfying our criteria will be deferred beyond the end of this year, an enquiry into this alleged fall of the birthrate should be undertaken at once. In anticipation of Government's decision our Calcutta members have initiated certain preliminary studies to this end.

40. Study of fertility as distinct from mortality is an important element in the development of full and useful population data. In our discussion of vital statistics we have urged the insertion in birth and death certificates of certain basic data for fertility studies. The full effect of this recommendation lies some years ahead and even then is largely contingent on the securing of full registration. There are other elements of present knowledge however, on this topic and possibilities of present work. The 1941 census brought this topic definitely into the Indian scene as one on which information was required and on which it could be secured. Preliminary investigations on specific fertility rates and net reproductive rates have been carried out by members of our Committee working at Calcutta. These have shown that fundamental parameters can be ascertained for India with considerable precision. For several years past, in respect of cities with a hundred thousand population or more, public health Departments as a result of initiative by the Central Advisory Board of Health have been collecting data regarding the age of mothers at confinement. To make use of this material for the purposes of fertility enquiries we need of course age tables and have already recommended the production of these for such cities. As soon as these age tables are ready work should be begun on the calculation of fertility and net reproduction rates. To some extent the field is new and the first steps would be exploratory by way of testing both the material and the methods, thereafter it could be gradually expanded.

We find that the Indian Statistical Institute has gathered from time to time a considerable amount of data on fertility. This is largely confined to Bengal. The elements are 9,000 weaving families and 1,000 agricultural families in rural areas—date of survey 1936-37 ; 1,000 middle-class families in Calcutta—date 1939-40 ; 3,500 working class families in five industrial centres in Bengal—date of survey 1940-42 ; about 16,000 rural families and 750 working class families in Bengal—date of survey 1944-45. The period range is appreciable and the categories limited. Nevertheless, while these could not in any sense be considered sample, they are certainly worth examination as type studies, in this new field we have to build up our knowledge from everything that offers and this element should not be neglected. We recommend therefore that 5,000 out of these 30,000 families should be chosen for preliminary study, mainly to determine methods so that subsequent work can be organised on sound lines. This should be entrusted to the Indian Statistical Institute.

41. In Appendix V we give a note showing the outcome of certain computations on the possibility of securing population estimates in Indian conditions, both in general and with particular reference to the Y sample. In that Appendix too we show the outcome of certain studies applied to the fertility data obtained by the Census Commissioner's enquiry referred to above.

Evidently, population projection requires an age distribution as well as a sex distribution. Civil condition is an obvious necessity also but fortunately in Indian conditions this is met by the fact that the vast majority of Indian women are married at an early age. From the strictly population point of view in fact it might be said that the age table is the most important of all for this purpose ; and, if, as the studies set out in Appendix V referred to show, the age structure in India is changing this makes the importance of an age record all the greater. The defects of Indian population data are to some extent compensated by the mass and variety they afford. This applies in particular when any question of sampling enters, and in the result we are definitely of opinion that the Census Commissioner's Y-sample does afford a reliable basis for making now age tables for 1941, from them life tables, and thence population projections cast in age groups.

42. The main theme of our report can be summed up as :—

(a) the Y-sample will carry the preparation of age tables, life tables and population projections. Therefore,

(b) these should at once be taken up.

It will probably assist however, if a certain order of effort is indicated.

We have already arranged for the Statistical Institute to continue studies on the methods best suited to our Indian material and conditions of attacking life tables and projections. This falls naturally into our Committee's field and its performance now will considerably assist the carrying out of the main programme recommended.

Another point on which we have taken action now is securing the full body of Bihar slips. There are two reasons for this.

The 1:50 sample in this province was not taken out in accordance with the Census Commissioner's instructions and was selective, not on the random basis prescribed. We do not criticise this, as the difficulties in early 1911 imposed by contraction of operations and the pressure for release of officers and winding up of staffs was acute. In any case therefore the Y-sample must be extracted for Bihar in order to enable the age table, etc., to be constructed.

We had intended to use the Delhi material, which had been put by another of the Census Commissioner's experiments into Hollerith form, for exhaustive study on the value range of samples of different sizes and our original scheme of work provided time and funds for this. Unfortunately however this material took a considerable time to reach us and when it did we found that it could not serve this purpose. Following standard Census tabulation practice a sex separation had been observed from the beginning and an order of sorting designed to suit necessities of training coders and in fact the general procedure of a census office. While finally by a remarkable feat of economy, data relating to three persons had been accommodated in a single card, these three persons being all of one sex.

Evidently therefore sub-sampling and other tests of randomness based on this Delhi material were ruled out. As it happens our main recommendation on the validity of the sample has been reached independently of this Delhi material and goes forward in this report. There remain however the general considerations of carrying out these further scrutinies which we regard as essential, looking to the further use of the Y-sample for other purposes than age tabulation. The Census Commissioner's experiment took 1:50; but for other purposes, other fractions may be more suitable and it is important to investigate this.

The Bihar material which is concentrated in one place distant only 70 miles by good road from a branch of the Indian Statistical Institute at Gurdikh affords an admirable and so far as can be seen the only opportunity of getting this vital work done.

43. Further, this work on the Bihar material will enable the Institute to study the sample in relation to other fields than age and in fact will provide Government with an invaluable stock of experimental knowledge. Convinced as we are that the proper application of modern methods and particularly sampling is the key to proper use of the mass of material thrown up by a country of this size, we are equally convinced of the necessity of taking nothing for granted. Our chairman's golden rule should be kept before every worker in samples. A sample must be specifically tested towards the specific purpose for which its use is contemplated. A sample valid for one aspect may be less satisfactory for another; this flows naturally from the fact that not all aspects are identically distributed throughout a population. Every human

being in India has an age or a community and these aspects are stable in very simple form. Means of livelihood is distributed in a very different way throughout the population and is itself a much more complicated phenomenon than age and even more so, than community. We do not say that the sampling method is unsuited to it; on the contrary we feel that it is; what we do say however, is that the sample must be tested against this aspect. There is no substitute for knowledge, and in this field as in so many others, knowledge must be worked for and must be extracted.

Here as in other parts of this Report we may seem to have looked beyond the immediate apparent limit of our terms of reference; but we feel we are entirely within the spirits of these terms. If the Government of India is to build up a sound and enduring system of population data it must first establish its methods and procedures, and operation on this body of Bihar slips on the lines proposed is a prime opportunity for doing so. We are fortified in this too by the specific concurrence of Professor Fisher.

44. We have examined the data bearing on the growth of population in India and have given the Government of India specific recommendations for action. Members of our committee have carried out the investigations we considered necessary and from these investigations we have been able to reach the important decision that in the X-sample the Government of India have a means of repairing the error of 1941. As stated in paragraph 36 certain technical studies are necessary consequences of this earlier work and we recommend that these should continue without interruption, in the hands of the Statistical Institute. Our original budget covered certain elements of work which we have not been able to carry out owing to delays in receiving material or to defects in the material when received. Fortunately however, our basic recommendation has been reached independently of these and in the result there is an unexpended amount. We regard it as essential that the studies indicated in earlier passages of this report should follow without interruption from our own activities and since some of these are in any case those which we would have carried out as part of the Committee's activities we have regarded it as proper to authorise our Calcutta members to proceed with them. And in general we recommend that any unexpended balance of the Committee's budget allocation be left with the Statistical Institute for the pursuit of these enquiries.

45. This in essence brings us to the end of our specific recommendations. We do not feel however that we can stop a study of the data bearing on population growth without offering our comment on the organisation at the centre which should direct the whole question of the regular procuring of such data in future and their steady improvement in range and in quality.

The first element is the census. We have been impressed by the Census Commissioner's views as set out in his published report for 1941 and in the Administration Report which we have also been enabled to see. The burden of his observations is that what he calls the phoenix system is by now a danger as well as an embarrassment and that in any case the universal count is a primitive method. We agree with him on both and recommend therefore serious and immediate attention by a competent authority to this question of the census of India, its continuance and its methods. It may be that India cannot escape the need for one more all-in count, although the Census Commissioner's report has shown the administrative and financial difficulties that may attend on this, and the extreme importance, if it is to be held, of impressing on the people of the country that it is they who make a census not the administrative agency which records their answers. However if another all-in count is unavoidable that makes it all the more important to develop to the utmost

simple methods which can accompany, check and if necessary replace, the all-in enumeration. We recommend the utmost attention to this point of beginning at once preparations to replace ultimately the country-wide count by some system of continuing samples. We feel that it is definitely possible and in the circumstances of India definitely desirable and indeed necessary.

These recommendations amount to a revolution in methods but changes appear revolutions only when they have too long deferred. The Census Commissioner started this revolution and it is important to take it to its proper conclusion within the next few years.

46. The field however is one, not several : the vital statistics, the census and other elements bearing on fertility and growth of population should be brought into a single view. Different means of applying that in governmental structure may present themselves but on the main issue there can be no two opinions. India must have a definite permanent administrative machinery to deal with population matters at the centre. This is nothing new ; other countries have long ago recognised the necessity of a concentrated direction and control of the collection and treatment of population data. The U. K. has a Registrar General, the U.S.A. has its Bureau of the Census, Canada has its Dominion Statistician. The agency for India we recommend should not be called merely a Census Bureau ; its name should indicate the field and a definite assumption by the Government of India of responsibility for the range and quality of population statistics is the essential feature. And along with that a clear articulation of expert knowledge and function on the three broad categories of statistics, health and economics.

Such arrangements might take the form of a Registrar General with the statutory duty of reporting each year on the state of the population. This officer would thus have the responsibility of seeing that all these features were embodied in his organisation. To erect a structure of this kind would take some time and Government should provide for the interim by erecting a population committee to arrange for continuation of the work we have started and in general to prepare the way for the full articulation we regard as essential, and in any case ensure a continuing direction and interest.

A corresponding organization would be essential in the Provinces also. It has been suggested to us that this might take the form of Deputy Registrars General for appropriate regions, not necessarily the present Provinces or States, these officers being definitely Government of India men. At any rate the principle of effective execution at the Province or State end is an essential part.

47. The application of the three categories of expert knowledge referred to could be applied in the form of continuing Advisory Committees for these fields. These could be erected now. When the Registrar-General is appointed or when any other Central Directing Authority takes over the whole field of Population Data, the operation of these Committees would be linked up with such Authority. In the meantime however it is not enough merely to erect Committees. The whole tenor of this Report will have shown the importance we attach to specific administrative responsibility and direction. There must be a definite authority assumed by the centre into which the operations and advice of these Committees can be fitted and we make this as an essential recommendation.

In this field in fact what is necessary is a clear distinction between administrative purpose, responsibility and execution, and detached expert advice and criticism. For the former the Government of India must erect a competent body and staff and pay them properly. Too long has there been an idea that a Coder or Computer is something below the lowest form of clerk, likewise that a man of definite statistical attainments and specialised knowledge is something on the level of a Secretariat Assistant.

The expert advice and criticism which are so necessary in the Statistical field would be supplied by the Committees.

48. Our function as a Committee has been completed by the investigations made and recommendations given but we shall as a body and as individuals be ready to give all information and assistance to whatever agency the Government of India erects.

49. We may sum up here the recommendations in order of time :—

(1) Studies and experiments on methods for compiling life tables and population projections.

(2) Transfer to the Statistical Institute Office at Girdih of the Bihar Census material at present stored at Hazari Bagh. On this material experiments in sample methods to be immediately started in addition to the actual drawing of a fresh Y-sample on random methods.

These two, as appropriate to the functioning of our own committee, we have already set in action.

(3) Preparation of life tables and population projections should begin at once for all areas for which age tables are already available and be extended to other age tables as these become remedy.

(4) Any sorting now of the whole 1941 record is impossible therefore.

(5) The Y-sample should be put into Hollerith card form. The file on this is under consideration by the Home Department who are responsible for census material. The decision should be taken at once and put into effect.

(6) For the purposes of completing the age record it would not be necessary to pass all the slips constituting the Y-sample into card form, as certain sample and other tabulations for age exist which would cover in part this particular field. Since however other enquiries will undoubtedly be based in this sample and indeed will have to be based on it since there is no possibility of full tabulation of the 1941 census record, it is desirable that the Y sample and the valid details in it should be put into card form to afford a basis for enquiries covering the whole census field.

(7) Within certain limits the time taken for this operation is a function of the number of machines that can be obtained. We recommend that the largest number available and which can be effectively used by the Institute be procured in order that this stage be taken at the earliest possible date. These machines will be necessary in any case at future enumerations and other enquiries.

(8) As soon as the Y-sample is in card form age tables should be constructed for those provinces for which they do not exist at present, viz., Madras, U. P. and Central Provinces and Berar with States and Agencies.

(9) Likewise for Bihar, Assam, Bombay and Orissa for which the samples were on a selective basis or observed non-standard age groupings.

(10) Age tables be prepared also for each city with a population of 100,000 or over.

(11) Immediate steps be taken to erect a house list for Bengal. In view of local difficulties this will require close preparation, supervision, and check and a special staff should be chosen and trained for its execution.

(12) Certain figures which have come before us could be interpreted as, indicating fall in the Bengal birth rate. It is of great importance to check this by a field enquiry at an early date. This should be based on the house list if prepared in time but otherwise conducted independently.

(13) Based on this house list a sample census should be taken in the early months of 1946 in Bengal. The units to be censused will be taken on a random basis worked out by the Statistical Institute.

(14) Arrangements should be made also all over India for the house list to be prepared and maintained as a regular feature of administration.

(15) Vital statistics—as soon as the house list is ready in Bengal and elsewhere a random sample be erected and for this sample by closely controlled enquiry by competent investigators the vital statistics be determined over a period of one year. From this sample should be prepared a projection of the vital statistics for the whole Province or appropriate region.

(16) In addition the Government of India should take positive steps to bring about ultimately complete regular and accurate vital statistics in India. The record should invariably show in the case of births, the age of the mother and the number of birth and for all births and deaths should invariably show the community and means of livelihood of the parent of the child or of the deceased person.

(17) It is essential that the Central Government enter the vital statistics field, by prescription of standards, establishing a right of inspection of provincial and States' figures, and by financial or other assistance as indicated. There should be an officer or organisation at the centre definitely charged with the co-ordination of all information on population growth, covering, that is, not only the census but the vital statistics and all allied matters. This provision could take the form of Registrar-General but whatever the form adopted there should be a statutory duty to report each year on the state of India's population and an absolutely clear and individual responsibility. All these matters affecting population statistics should be regarded as basic information at the root of the whole Government effort.

(18) Government should draw the attention of Insurance Companies and Government departments, States and Provinces which transact such business, to the importance and value of conducting continuous and extensive investigation of mortality conditions among insured persons. The Government of India through the Registrar-General or other authority should be prepared to give direction and assistance to such enquiries.

50. We cannot close this report without expressing our thanks to all those who have assisted us in what has been a difficult enquiry raising issues of the highest importance. Education, Health and Lands Department in the person of the Hon'ble Member, Sir Jogendra Singh, and the Joint Secretary, Mr. Oulsnam, have been always helpful and interested and, among others, who have taken their part in our effort, we should mention the technical and clerical staff of the Statistical Institute especially Messrs. Susobhan Banerjee, Sunit Gupta and Susanta Guha; and the stenographers, attached to our Chairman, Messrs. P. K. Sanyal and Wilayat Husain, who have performed prodigies of labour and skill in preparing our series of reports and appendices.

M. YEATTS, *Chairman.*

P. C. MAHALANOBIS, *Member.*

K. MADHAVA, *Member.*

K. C. K. E. RAJA, *Member.*

T. GREGORY, *Member.*

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APPENDIX I.

LETTER FROM THE GOVERNMENT OF INDIA, DEPARTMENT OF EDUCATION, HEALTH AND LANDS, TO ALL PROVINCIAL GOVERNMENTS, DATED THE 15TH MAY, 1944.

I am directed to say that in view of the importance of problems concerning growth of population in relation to reconstruction planning the Government of India have constituted a small expert committee to examine and advise the Government of India on the available data relating to growth of population. The Committee is constituted as follows :--

Chairman.

M. W. M. Yeatts, Esquire, C.I.E., I.C.S.

Members.

Sir Theodore Gregory, D.Sc., Economic Adviser to the Government of India.

Professor P. C. Mahalanobis, O.B.E., B.Sc. (Cal.), M.A. (Cantab), F.S.S., F.N.I., Director, Indian Statistical Institute, Calcutta.

Professor K. B. Madhava, Head of the Department of Mathematical Economics and Statistics in the Mysore University.

Dr. K. C. K. E. Raja, L.M.S., L.R.C.P. and S., L.R.F.P.S., D.P.H. (Cemb.) and D.T.M. and H. (Camb.), Secretary to the Health Survey and Development Committee.

The enquiry will be based on the Indian Statistical Institute, Calcutta, where the statistical work will be carried out.



APPENDIX II.

Position relating to age-tables.

1. Age tables based on complete enumeration are available as under only for a population of 60.278 millions out of a total population of 388.997 millions enumerated at the census of 1941.

British Territory.		Indian States.	
1. Delhi	0.918 millions.	4. Hyderabad	16.339 millions.
2. Ajmer-Merwara	0.584 „	5. Rajputana	13.670 „
3. Piploda	0.005 „	6. Mysore	7.329 „
		7. Travancore	6.070 „
Total	1.507	8. Kashmir & Feudatories	4.022 „
		9. Gwalior	4.006 „
		10. Bundelkhand	1.729 „
		11. Indore	1.514 „
		12. Cochin	1.423 „
		13. 3 States of Central India	1.419 „
		14. Patna State	0.632 „
		15. Bhavnagar	0.618 „
		Total	58.771

2. Age tables are also available as under for a population of 100.428 millions based on sample slips selected uniformly in the ratio of 1 to 50 over the whole of each area.

British territory.		Indian States.	
16. Bengal	60.306 millions.	20. Baroda	2.855 millions.
17. Punjab	28.419 „	21. Cooch Behar	0.641 „
18. Sind	4.535 „	22. Tripura	0.513 „
19. N.W.F.P.	3.038 „	23. Sikkim	0.121 „
Total	96.298	Total	4.130

3. For the following two areas age tables were compiled on the sample basis.

British territory.		Millions.
24. Bombay		20.850
25. Orissa		8.728
Total		29.578

In Bombay however the ratio used was 1 in 30 in Bombay city, and the prescribed ratio 1 in 50 for the rest of the province. The additional weightage given to Bombay city destroyed the representativeness of the sample, and this has to be set right.

In Orissa, the tabulated statements give for ages beyond 20, the totals in 10 yearly periods (20—30; 30—40; 40—50; 50—60) followed by an omnibus total for the ages over 60 instead of the more useful and prescribed classification in 5 yearly intervals up to 70 (20—25; 25—30; 30—35...65—70) with an aggregate for all ages beyond 70. It is therefore essential to have this material retabulated on the standard model.

4. In respect of the following three areas (comprising in all 47.046 millions)

	Millions.
26. Bihar	36.340
27. Assam	10.205
28. Baluchistan	0.501
Total	47.046

age tables have been published in the Census Reports, but the sample slips utilised for the purpose (though selected in the ratio of 1 in 50) are not co-extensive with the province they were to represent. Thus in Baluchistan only 'rural areas' (covering a population of 0.744 millions and excluding 0.144 millions "urban population") were included.

In Assam the slips used were restricted to selected tribes and communities, viz., labourers in Cachar tea gardens, Khasis of Shillong Sadar sub-division, Nagas of Naga Hills Districts, Muslims in North Sylhet sub-division, Hindus of all thanas (except Gauhati) of Gauhati sub-division, and Scheduled castes in certain localities. In fact only 33,253 slips were used for preparing the age-tables out of a total of 204,000 Y-slips for the whole province.

In Bihar, the ratio of 1 in 50 should have given 7,26,800 slips for British territory alone. But the age tables have been based only on 213,998 slips which represent certain selected sub-divisions in eleven districts and one State.

Serious distortions have been introduced by the arbitrary manner in which selected portions of the sample slips were used for preparing the age tables. The age-tables must, therefore, be prepared again.

5. For the following areas covering a population of 151.667 millions, no age tables whatsoever, that is those based on either the complete enumeration, or on the sample slips are available.

British territory.	Indian States.
29. U. P. 55.021	34. Punjab States . . . 5.504 millions.
30. Madras 49.342	35. Western India States 4.286(a) "
31. C. P. and Berar . 16.813	(excluding Bhavnagar).
32. Coorg 0.169	36. Chhattisgarh . . . 3.418 "
33. Andamans & Nicobar Islands. 0.034	37. Orissa States . . . 3.024 "
	38. Central India States . 2.844(a) "
	39. Deccan States . . . 2.785 "
Total 121.379	40. NWFP States . . . 2.377 "
	41. Gujerat States . . . 1.459 "
	42. Punjab Hills . . . 1.091 "
	43. Bengal States . . . 0.991(a) "
	44. U. P. States . . . 0.928 "
	45. Assam States . . . 0.726 "
	46. Madras States . . . 0.499 "
	47. Baluchistan States . 0.356 "
	Total 30.288

(a) Estimated totals of States including in the Agency which have not tabulated their census material.

APPENDIX III—(A).

Distribution of Rural Districts, by provinces, with respect to their average birth rates for a period of 3 years, 1937-1939.

Province.	Average.		Birth.			Rates.					
	Average birthrate for total area of rural circles. Per mille.	Over 45 per mille.	Between 45 and 40 per mille.	Between 40 and 35 per mille.	Between 35 and 30 per mille.	Between 30 and 25 per mille.	Between 25 and 20 per mille.	Between 20 and 15 per mille.	Between 15 and 10 per mille.	Between 10 and 5 per mille.	Below 5 per mille.
Madras (24 Rural Districts.)	38.56 per mille.	..	7	14	3	..	..	..	..	..	..
Punjab (29 Rural Districts.)	46.25	17	7	4	..	..	1	..	..	..	..
United Provinces (48 Rural Districts)	35.19	2	13	13	9	9	2	..	..	..	..
Bombay (20 Districts)	43.03	8	6	2	3	..	1	..	..	..	..
C. P. & Berar (19 Rural Districts)	40.12	2	7	8	2	..	..	..	..	..	..
Orissa (7 and 2 Agency Distts.)	34.76	..	1	4	2	..	1	NW.	1	..	..
Assam (8 Districts)	27.15	..	..	1	3	2	1	1	..	..	..
Bihar (16 Districts)	34.5	1	2	4	5	4	..	..	..	..	..
Sind (8 Districts)	16.07	..	..	..	..	..	1	4	3	..	..
Bengal (26 Districts)	26.9	..	1	9	9	7	..	..	..	..	..
N.W.F.P. (6 Districts)	*30.80	..	1	1	..	4	..	..	..	..	..

* All the figures for N. W. F. P. are averages of those for 1938 & 1939.

APPENDIX III. (B)

Distribution of Municipalities and Rural towns, by Provinces, with respect to their population and average birth rates for a period of 3 years, 1937-1939.

Population.	Birth rate for all the Municipalities & Rural towns.	Over 45 per mille.	Between 45 & 40 per mille.	Between 40 & 35 per mille.	Between 35 & 30 per mille.	Between 30 and 25 per mille.	Between 25 & 20 per mille.	Between 20 & 15 per mille.	Between 15 & 10 per mille.	Between 10 & 5 per mille.	Below 5 per mille.
Madras (324) *	†39.81										
10,000 & over		31	44	58	32	16	..	..	..	..	..
10,000 to 5,000		28	33	42	22	14	3	..	†1	..	..
Under 5,000		..	..	..	..	..	..	..	..	..	..
Total		59	77	100	54	30	3	..	1	..	..
Bombay (92) *	38.09										
10,000 & over		15	12	6	14	12	9	5	..	..	..
10,000 to 5,000		2	2	3	3	3	..	3	1	..	..
Under 5,000		..	..	..	1	1	..	..	..	..	..
Total		17	14	9	18	16	..	8	1	..	..
C.P. & Berar (111) *	44.11										
10,000 & over		23	17	6	4	..	..	..	..	1	..
10,000 to 5,000		11	17	16	7	1	..	..	1	..	..
Under 5,000		4	..	2	..	1	..	..	..	..	..
Total		38	34	24	11	2	..	..	1	1	..
Assam (28) *	32.54										
10,000 & over		1	..	1	3	1	1	..	..	..	..
10,000 to 5,000		..	..	3	4	2	..	..	..	..	..
Under 5,000		2	..	..	4	2	1	..	1	..	..
Total		3	..	4	11	5	2	..	1	..	..
Bengal (119) *	23.3										
10,000 & over		..	2	3	6	11	18	16	16	5	..
10,000 to 5,000		..	1	..	..	4	4	13	5	2	1
Under 5,000		..	..	..	1	1	3	4	3	..	..
Total		..	3	3	7	16	25	33	24	7	1
Bihar (53)*	19.9										
10,000 & over		..	..	1	7	4	4	7	6	5	..
10,000 to 5,000		1	1	1	1	3	5	5	..	2	..
Under 5,000		..	..	..	..	..	..	..	..	..	..
Total		1	1	2	8	7	9	12	6	7	..

APPENDIX III (B)—contd.

distribution of Municipalities and Rural towns, by Provinces, with respect to their population and average birth rates for a period of 3 years, 1937-1939.

Population.	Birth rate for all the Municipalities & Rural towns.	Over 45 per mille.	Between 45 & 40 per mille.	Between 40 & 35 per mille.	Between 35 & 30 per mille.	Between 30 and 25 per mille.	Between 25 & 20 per mille.	Between 20 & 15 per mille.	Between 15 & 10 per mille.	Between 10 & 5 per mille.	Below 5 per mille.
Orissa (8)*		24-90									
10,000 & over	..	..	1	1	..	3	1	1	1	..	..
10,000 to 5,000	..	..	..	..	..	..	..	..	..	..	..
Under 5,000	..	..	..	..	..	..	..	..	..	..	..
Total	..	..	1	1	..	3	1	1	1	..	..
U. P. (439)*		45-25									
10,000 & over	..	60	16	9	11	10	6	..	3	..	..
10,000 to 5,000	..	50	16	20	15	14	8	10	2	..	..
Under 5,000	..	87	24	21	21	10	10	7	4	1	1
Total	..	197	56	50	47	34	24	20	9	1	1
Punjab (176)*		40-51									
10,000 & over	..	31	12	13	1	3	..	3	..	..	..
10,000 to 5,000	..	34	21	12	7	7	..	3	1	..	..
Under 5,000	..	10	6	1	..	3	2	1	5	..	..
Total	..	75	39	26	8	13	2	7	..	..	..
N. W. F. P. (17)*		28-36†									
10,000 & over	..	..	2	..	..	2	3	..	2	..	..
10,000 to 5,000	..	1	1	1	1	2	2	..	..	..	..
Under 5,000	..	..	..	..	..	..	..	..	..	..	..
Total	..	1	3	1	1	4	5	..	2	..	..
Sind (30)*											
10,000 & over	..	..	..	..	..	..	..	..	..	..	..
10,000 to 5,000	..	..	..	..	..	..	..	..	..	..	..
Under 5,000	..	..	..	..	..	..	..	..	..	..	..
Total	..	3	1	4	2	1	3	2	12	2	..

* These represent the total number of towns in each province.

† Figure for 1937 only.

‡ All the figures for N. W. F. Province are average of those for 1938 & 1939.

APPENDIX IV.

Prof. R. A. Fisher's Note.

My opinion is that the agreement between estimates based in the Y-sample and the complete count is in many cases quite satisfactory showing that in these cases the Y-sample has behaved like a true random sample.

In certain cases, however, statistically significant divergences were observed. This suggests that either (a) the two per cent. samples were not always drawn in strict accordance with instructions or (b) the figures based on the complete enumeration are not themselves perfectly accurate. There is some evidence in support of both (a) and (b). For example, in Bombay city, Bihar and Assam (a) is known to have occurred. On the other hand, statements tabulated by Hollerith machine based on Delhi complete enumeration material show differences from the figures as published in the Census Report; perfect agreement should have been observed in these cases.

The observed differences between estimates based on Y-sample and complete enumeration are small in magnitude even when these are statistically significant. Experimental tabulations and projections showed that in every case, Y-samples gave results adequate for all practical purposes. Sample estimates of births and deaths, were, for example, extremely satisfactory, the largest difference in any Census being 4.017 or 5.5 per cent. It should be possible therefore to obtain satisfactory age and life tables and population projections on the basis of the Y-samples.

It was intended to use the Delhi complete enumeration material to study the possibilities of using the sampling method in Census work. Unfortunately this could not be done as the form in which the Delhi material was preserved was unsuitable for this purpose. I understand however that Bihar slips of complete enumeration are still available; and if so, this material (or a portion of it) may be used for further studies.

I have also looked into the special features of census figures in Bengal. The conditions in which the Census was taken in Bengal were so extraordinary that it is difficult to reach any definite conclusion about the true population of the province in 1941. I have already suggested to the Bengal Administration Committee that attempts should be made to prepare a complete list of houses as early as possible. If this is done it would be possible to use the house list as the basis for sample counts of the population from time to time. The house list may also be used gradually to improve the birth and death registrations.

Population projections have to be based on both reproduction and mortality rates. Arrangements should therefore be made for continuous study of net reproductive rate and differential fertility. The sample survey may be used with advantage in this connexion.

R. A. FISHER.